CLAIMS

1. A transformer comprising at least one high voltage winding and one low voltage winding, **characterised in** that each of said windings comprises a flexible conductor having electric field containing means but which is magnetically permeable and in that the windings are intermixed such that turns of the high voltage winding are mixed with turns of the low voltage winding.

2. A transformer according to claim 1, **characterised in** that said low voltage winding is wound as a low voltage winding layer positioned between two corresponding adjacent high voltage winding layers.

3. A transformer according to claim 1 or 2, **characterised in** that said windings are arranged in a repeated periodic pattern of one high voltage winding layer, followed by a low voltage winding layer, followed by two high voltage winding layers, followed by a low voltage winding layer, followed by two high voltage winding layers, etc.

4. A transformer according to any one of claims 1 to 3, **characterised in** that each one of at least some of the turns of the low voltage winding is split into a number of subturns connected in parallel for reducing the difference between the number of high voltage winding turns and the total number of low voltage winding turns.

5. A transformer according to claim 4, **characterised in** that each turn of the low voltage winding is split into a number of parallel-connected subturns equal to the number of high voltage winding turns.

6. A transformer according to claim 5, **characterised in** that the turns of the high voltage winding and the turns in the low voltage winding are arranged symmetrically in a chessboard pattern, as seen in a cross-section through the windings.

7. A transformer according to any one of the preceding claims, **characterised in** that the conductor comprises central electrically conductive means, a first layer having semi-conducting properties provided around said conductive means, a solid insulating layer provided around said first layer, and field containing means comprising a second layer having semi-conducting properties provided around said insulating layer.

8. A transformer according to claim 7, **characterised in** that the potential of said first layer is substantially equal to the potential of the conductor.

9. A transformer according to claim 7 or 8, **characterised in** that said second layer is arranged to constitute substantially an equipotential surface surrounding said conductor.

10. A transformer according to claim 9, **characterised in** that said second layer is connected to a predetermined potential.

11. A transformer according to claim 10, **characterised in** that said predetermined potential is ground potential.

12. A transformer according to any one of claims 7 to 11, **characterised in** that at least two adjacent layers have substantially equal thermal expansion coefficients.

13. A transformer according to any one of claims 7 to 12, **characterised in** that said central conductive means comprises a plurality of strands of wire, only a minority of said strands being in electrical contact with each other.

14. A transformer according to any one of claims 7 to 13, **characterised in** that each of said three layers is fixedly connected to the adjacent layers along substantially the whole connecting surface.

15. A transformer according to any one of claims 7 to 14, **characterised in** that the conductor also comprises a metal shield and a sheath.

16. A transformer according to any one of claims 7 to 15, **characterised in** that the cross-section area of the central conductive means is from 80 to 3000 mm^2.

17. A transformer according to any one of the preceding claims, **characterised in** that the external diameter of the conductor is from 20 to 250 mm.

18. A transformer according to any one of the preceding claims, **characterised in** that struts (27) of laminated magnetic material are located between the windings.

19. A transformer according to any one of the preceding claims, **characterised in**

that the electric field containing means is designed for high voltage, suitably in excess of 10 kV, in particular in excess of 36 kV, and preferably more than 72.5 kV up to very high transmission voltages, such as 400 kV to 800 kV or higher.

20. A transformer according to any one of the preceding claims, **characterised in** that the electric field containing means is designed for a power range in excess of 0.5 MVA, preferably in excess of 30 MVA and up to 1000 MVA.

21. A method of winding a transformer, comprising simultaneously winding high voltage and low voltage flexible conductors having electric field containing means but which are magnetically permeable, such that turns of the high voltage winding are intermixed with turns of the low voltage winding.

22. A method according to claim 19, **characterised in** that the high voltage and low voltage conductors are simultaneously unwound from respective drums and wound on to a transformer drum.

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